



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Samuel C. Weaver

Serial No. 09/838,866

Filed: April 20, 2001

Art Unit: 3643

Patent Examiner: Nguyen, Son T.

Our Ref: 01-211

METAL MATRIX  
COMPOSITE HORSESHOE

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Decl.  
Cofor  
9-16-03  
**RECEIVED**

AUG 29 2003

**GROUP 3600**

Assistant Commissioner for Patents  
Washington, DC 20231

August 21, 2003

**DECLARATION OF SAMUEL C. WEAVER**

NOW COMES Samuel C. Weaver, the inventor in the above-captioned application, who declares that the following facts are true, complete and correct:

1. For the last 38 years, I have worked in various metal-related fields including fields relating to metal matrix composites and ceramic composites. Prior to that time, I earned the following degrees: Bachelor of Science in Metallurgical Engineering from University of Missouri at Rolla; Master of Science in Metallurgical Engineering from the University of Tennessee; and Ph.D. in Metallurgical Engineering from the University of Tennessee.
2. I have founded two companies that developed metal materials and metal matrix composites as well as a number of commercial products that are manufactured from those materials.

3. I am the inventor in the above-captioned application U.S. Application Serial No. 09/838,866 (herein "the '866 Application"). I am also an inventor in U.S. Patent Nos. 5,587,241, 5,573,985, 5,573,607, 5,077,246, 4,906,324, 4,873,069.
4. One of the patents of which I am an inventor, U.S. Patent No. 5,573,607 (herein "the '607 Patent"), was cited in an Information Disclosure Statement that was filed April 20, 2001 with respect to the '866 Application. The '607 Patent was thereafter cited by the Patent and Trademark Office in the prosecution of the '866 Application as the primary reference in Official Actions dated February 26, 2002 and May 15, 2002. The '607 Patent has been assigned to the same assignee as the '866 Application.
5. In the past, certain horseshoes were made of materials that were both lightweight in comparison to conventional ferrous-material horseshoes and long wearing in comparison to some known lightweight metal alloys (such as aluminum alloys) that have been used to construct horseshoes. Examples of such materials are aluminum alloys such as described in U.S. Patent 5,344,608 (herein "Eom") which has been cited and applied in the '866 Application.
6. The '866 Application discloses a horseshoe that also is lightweight in comparison to conventional ferrous-material horseshoes and long wearing in comparison to some known lightweight metal alloys (such as aluminum alloys) that have been used to construct horseshoes.
7. In addition to the lightweight and long wearing properties of metal alloy horseshoes, the '866 Application discloses a horseshoe that also provides a cushioning property resulting from vibration damping.
8. Aluminum alloys such as described in Eom belong to the group of metal alloys. Such materials generally do not have a vibration damping property such as afforded by the metal matrix composite of the '607 Patent.

9. At the time of the invention of the '866 Application, it was known that the metal matrix composite described in the '607 Patent afforded advantages for certain applications in which aluminum, magnesium or titanium metals are used. However, the metal matrix composite of the '607 Patent was not known to be a universal substitute for all uses of those metals. Moreover, at the time that the '607 Patent issued, it was not known that the metal matrix composite described in the '607 Patent had relatively high cushioning.
10. Eom describes an aluminum alloy. An alloy is a mixture of two or more metals.
11. The '607 Patent describes a metal matrix composite that is comprised of aluminum, magnesium or titanium and alloys thereof containing silicon-boride particles. A metal matrix composite is not pure metal and is not a metal alloy. The metal matrix composite that is disclosed in the '607 Patent is not a metal alloy and is not a universal substitute for metal alloys. The metal matrix composite of the '607 Patent has certain properties that are substantially different than those of metal alloys.
12. I have carefully reviewed the Eom Patent but have found nothing therein that would lead one normally skilled in the art to substitute a metal matrix composite for the aluminum alloy that is taught by the Eom Patent.
13. The '607 Patent states that "some" drawbacks of aluminum, magnesium and titanium metals have been overcome through the use of metal matrix composites of those metals. However, this does not mean that metal matrix composites are appropriate for use in every application for which a metal could be used. For reasons of material strength and other properties, there are some applications for which substitution of metal matrix composites are not suitable.
14. Nothing in '607 Patent describes the metal matrix composite to have a high cushioning property. One normally skilled in the art could not assume that metal matrix composite described in the '607 Patent would exhibit a high cushioning or vibration damping property. Some metal matrix composites do not exhibit a high vibration damping property.
15. Vibration damping in the metal matrix composite described in the '607 Patent was

not known at the time that I made that invention or even at the time that the '607 Patent issued. Several years after the '607 Patent issued, an aluminum matrix composite composed of silicon borides and aluminum was tested under my direction for vibration damping. The vibration damping tests used a transient response method to measure damping behavior. The test was conducted to determine the suitability of the aluminum matrix composite for use in computer memory discs. The test results determined that vibration damping in the aluminum matrix composite was 4.25 times greater than vibration damping in aluminum. Prior to that time, the degree of vibration damping of the aluminum matrix composite was unknown.

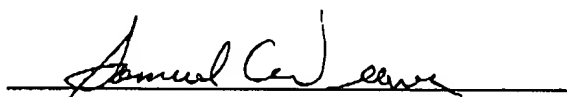
16. Based on my education and experience in the field of metallurgy, prior to the time of the above-mentioned tests, the vibration damping property of the aluminum matrix composite was unknown and the relatively high vibration damping of that metal matrix composite was unexpected. Except for testing such as I had performed on the aluminum matrix composite, I am currently unaware of another manner in which the vibration damping properties of a particular metal matrix composite can reliably be predicted.
17. The test results described in Paragraph 15 above show that metal matrix composite horseshoes as further described in the '866 Application have an improved vibration damping property.
18. Based on my education and experience, I conclude that it would not be obvious for one normally skilled in the art to select the metal matrix composite of the '607 Patent for the manufacture of horseshoes having a vibration damping coefficient that was high relative to the damping coefficient of prior art materials that are lightweight and also have high stiffness.
19. I am familiar with the level of education, experience and skill of one normally skilled in the relevant art. The teachings of the '607 Patent would not lead one normally skilled in the art to expect high vibration damping in a horseshoe made

of the metal matrix composite nor would any teaching of the '607 Patent lead one normally skilled in the art to substitute the metal matrix composite of the '607 Patent for the aluminum alloy described in Eom Patent.

20. At the time that the invention of the '866 Application was made, the teaching of the '607 Patent would not have motivated one normally skilled in the art to attempt to use a metal matrix composite as described therein to produce a horseshoe having high vibration damping because the '607 Patent does not describe the metal matrix composite to have a high vibration damping property and I am aware of no manner by which to reliably predict the level of vibration damping based on the disclosure of the '607 Patent.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Further I say not.

A handwritten signature in cursive script, appearing to read "Samuel C. Lee", is written over a horizontal line.